

## Chapter 2. Current Situation

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### Setting

This section briefly describes the setting for a number of factors related to JDSF. Substantially more detailed discussion of Setting can be found in the December 2005 DEIR.

#### Location

Jackson Demonstration State Forest (JDSF) is located a little northward of the geographic center of the redwood region, which stretches 500 miles from Del Norte County through Monterey County. About half the total area of redwood forest is located to the north of JDSF and about half to the south. With 542,000 acres of redwood forest, Mendocino County encompasses more redwood forest area than any other county in California (Fire and Resource Assessment Program 2002).

JDSF includes portions of the Noyo and Big River watersheds, as well as several small watersheds that drain directly to the Pacific Ocean. JDSF covers approximately 48,652 acres in central Mendocino County (see Figure 1). It varies from 2½ to 8 miles wide in a north-south direction, and is about 16½ miles long on the east-west axis. Its western boundary is within 1.5 miles of the coast, and the eastern boundary generally lies on the crest of the Mendocino Ridge separating the coastal slopes from the inland valleys, approximately 7 miles west of Willits.

The City of Fort Bragg, where the JDSF headquarters facility is located, is 2 miles north of the western property boundary. The town of Mendocino is located 2 miles west of the southwest corner of JDSF. The town of Willits and the Brooktrails development are located approximately 7 miles to the east. Ukiah, the county seat, is 35 miles southeast of JDSF.

#### Forest Ownership and Management Trends

The North Coast of California is characterized by extensive areas of private forest land along the western portions of the counties, and a mix of private forests, public forests, and non-forest lands in the eastern portions of the counties. Redwood dominates the cool, fog influenced coastal regions, while Douglas-fir and other tree species are more common farther inland.

The North Coast, Mendocino County, JDSF, and the surrounding area have a long history of timber harvesting, reforestation, and other timber management activity that dates back to the mid 1800s in some areas. Timber management activities have been a primary and substantial source of economic activity for the North Coast region and Mendocino County. Forest management has also resulted in environmental impact and social controversy.

Although the development and land use history of the area is somewhat patchy, this region is known to have been occupied by Native peoples for centuries before European settlers began to settle as early as the 1600s. By 1860, a major redwood milling operation was established near the mouth of Big River, and by 1885, another major redwood milling operation had been established near the mouth of the Noyo River. Logs were brought down the drainages and to the shores of the Pacific Ocean and loaded onto ships for transport to destinations to the south along the coast. Towns and cities developed along the coast, largely associated with the logging and fishing industries. Railroads were eventually extended inland, and operated for many decades, until being replaced by truck roads in the 1940s. Roads and highways were constructed, with some of the major routes linking the coast to inland areas being paved

to accommodate the increasing levels of log transport, and transport of other goods and people between the coastal and interior regions.

Most of the forested areas of Mendocino County have been historically owned and managed as relatively large contiguous entities. The family-owned companies were largely replaced by corporate entities during the 1960s and 1970s, and these corporate ownerships have mostly been replaced by other forms of ownership over the past 10 to 15 years.

#### History of Jackson Demonstration State Forest

Caspar Creek and the Caspar Lumber Company were named after Siegfried Caspar, a German immigrant who owned a cattle operation in this area. Initial logging on what is now JDSF began in 1862 when the Kelley and Rundle sawmill, supplied by a surrounding 5,000 acres of virgin redwood land, started operating near the mouth of Caspar Creek (Wurm 1986). In 1863 Jacob Green Jackson, a lumber dealer who owned lumber yards in Stockton and San Francisco, bought out the owners of the Kelley and Rundle operation and founded the Jackson Lumber Company. Lumber from the Caspar Lumber Company was transported to markets, mainly San Francisco, by schooners until the early 1930s.

In February 1946, C. J. Wood, the president of Caspar Lumber Company, offered to sell up to 51,000 acres of the company lands to the State at a reasonable price. A condition of sale was that the company could operate up to 15 years on some reserved old growth timber. The State finally entered into a contract with the company to buy the lands on January 31, 1947 for one and a half million dollars. The purchased lands were named Jackson State Forest after the original owner of the land, Jacob Green Jackson. For tax reasons, C. J. Wood chose to transfer the properties to the state in five separate transactions, the last of which took place in 1951. Separately from the Caspar Lumber Company transactions, the Mendocino Woodlands Recreation Demonstration Area was added to JDSF at approximately the same time. This 5,425 acre property had been acquired from the Mendocino Lumber Company in 1935 by the U.S. Resettlement Administration, and was being administered by the National Park Service. The property was conveyed by deed to the Division of Forestry on September 11, 1947, and incorporated into JDSF. Figure 1 shows the lands covered by the initial purchase as well as the subsequent Mendocino Woodlands transaction.

Prior to the first harvest entries in JDSF beginning in the 1860s, most of the Forest can be assumed to have been virgin old growth. The coastal watersheds were all very heavily cut up until the 1930s when developing tractor technology and other factors allowed partial harvesting to extend further inland.

The earliest harvests in the original old growth forest in the area which now constitutes JDSF were done with primitive technology, relying on rivers to float logs to the mill. This limited logging occurred within the Caspar Creek drainage immediately above the Caspar Mill, and along the lower slopes above the larger watercourses such as the South Fork of the Noyo River and the North Fork of Big River. The late 1800s witnessed the introduction of railroads and steam yarders. Most of the stands from the coast inland, up to the Chamberlain drainage, were clear cut with this technology. Forest management was largely non-existent during this period. Emphasis was placed upon extraction of what seemed like a virtually inexhaustible resource of old growth trees, and upon overcoming the challenges of logging and transporting very large trees with the primitive technology of that era. By 1947 when the State acquired Caspar Lumber Company's holdings, most of the coastal watersheds such as Caspar and Hare Creek, had regenerated to even-aged stands of 15 to 60 year old second-growth timber, though post-logging fires had burned through many of the regenerated stands.

Caspar Lumber Company started partial cutting on the East End of the Forest in the 1930s, in the Chamberlain Creek drainage. Chamberlain Creek defines the boundary between the East End and the West End of the Forest. After acquiring the Forest, the State continued partial cutting in this drainage and the James Creek drainage during the 1950s and 60s. This first round of partial harvest was an individual marked tree cut that removed about 70 percent of the conifer volume. As a result, most of the large old growth trees were removed. This initial cut was followed by a diameter limit harvest that removed most remaining conifer trees greater than 22 inches in diameter. This harvest pattern on the east end of the

Forest resulted in an irregular uneven-aged stand structure, characterized by a relative abundance of hardwoods, poletimber and small sawtimber-sized young second-growth conifers, and individual scattered residual old-growth conifers.

This kind of irregular stand structure is typical of current stands on the East End of the Forest, and distinguishes the east end from the West End of the Forest. Although the West End of the Forest was subject to partial cutting of the second growth stands it has retained a more uniform stand structure due to the early history of large-scale clearcutting within the coastal watersheds. Existing forest structure characteristics play a part in determination of current and planned management of the Forest.

In the late 1950s, after most of the old-growth areas within JDSF had been entered, management began to investigate the feasibility of harvesting second-growth stands. Since the oldest second growth stands were located within the Caspar Creek watershed, the first second-growth harvest on the Forest took place there. Harvest in second-growth stands subsequently occurred in the Caspar, Jughandle, Hare Creek, and South Fork Noyo River watersheds during the 1960s.

Management of JDSF has made use of both even-aged and uneven-aged systems. A range of silvicultural methods has been in use on the Forest, for research and demonstration projects as well as operational forest management (Lindquist 1988). Harvest on JDSF has generally involved longer rotations and less frequent re-entries than on most industrial timberlands within the region. As a result, many of the restrictions on timber management described in this document have been under implementation for some time.

### Surrounding Land Use

Within central Mendocino County, lands to the north and south of JDSF are classified as Forest Lands (FL) in the Mendocino County General Plan (as is JDSF). Lands directly on the eastern boundary of JDSF are classified as FL and Range Land (RL). Further to the east are the large areas of Rural Residential (RR) as well as the thousands of smaller residential lots in the Brooktrails development. The Land Use Classifications for the west side of JDSF are Rural Residential (RR), Remote Residential (RMR), Public Service (PS) and Solid Waste Landfill (SW) (Mendocino County 2003). A potential area of conflict exists where Rural Residential areas are immediately adjacent to areas where timber harvesting or other activities involving heavy equipment are conducted. Examples of possible indirect impacts are changes in aesthetics, alteration of wildlife habitats, and noise impacts.

Other important neighbors of JDSF on the west and southwest include several State Park units (Jughandle State Reserve, Russian Gulch State Park, Mendocino Woodlands State Park, and the Big River Unit of the Mendocino Headlands State Park). Recently, the Conservation Fund acquired approximately 12,000 acres in the Big River watershed, immediately to the south of the central part of JDSF. The Conservation Fund will be managing this area for sustainable forest management, including repair of erosion sources.

### Climate

The Pacific Ocean is a moderating influence on the climate of the region. JDSF has a Mediterranean climate, characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers. Fog is a dominant climatic feature, generally occurring frequently during the summer months, and less frequently during the rest of the year. Air temperature is strongly influenced by the extent of the coastal fog belt, which extends inland up to 20 miles or more during summer nights, generally burning off back towards the coast by afternoon.

About 90 percent of the precipitation in this area falls between October and April, with the highest average monthly precipitation in January. Winter storms from the Pacific Ocean bring intense rainfall over several hours or days, particularly warmer storms from lower latitudes. Snow is infrequent and usually does not remain even at higher elevations inland. Mean annual precipitation is 39 inches at Fort Bragg

[California Department of Water Resources (CDWR) 1997], but measures higher in the Caspar Creek watershed, where annual means of 51 inches and 45 inches have been recorded at the North and South Fork gages, respectively (Ziemer 1996). Mean annual precipitation at Willits, just a few miles to the east of the JDSF, is slightly higher at 55 inches (CDWR 1997). The rainfall, runoff, and stream discharges in this region are all considerably lower than the wetter redwood forest areas in Humboldt and Del Norte counties to the north.

### Topography and Geology

JDSF and the surrounding area are located on the coastal side of the Mendocino Coast Range. The State Forest lands extend from gently sloping marine terrace surfaces along the Mendocino coastal plain in the west, to increasingly steep, rugged terrain in the eastern part of JDSF that is along the crest of the Mendocino Coast Range. The geomorphology of the coastal mountains of Mendocino County has been strongly influenced by two on-going processes: tectonic uplift and fluctuations in sea level. The landscape is especially affected during low sea level stands, when the coastline moves farther west. During these events, streams down-cut and form deeply incised valleys with steep-sided inner gorges. Once sea level rises (as at present) and the coastline advances, streams aggrade, the deep coastal valleys partially in-fill and estuaries form at the mouths of larger streams.

In general, the landscape is characterized by moderate to high relief. Slopes are less steep in the western watersheds within the Forest, and are steeper to the east in the watersheds nearer the crest of the Mendocino Coast Range. Elevations range from less than 100 feet within stream valleys along the western edge of JDSF, to a maximum of 2,092 feet in the southeast corner. The area drains directly to the Pacific Ocean. The local stream pattern is reminiscent of a "trellis", where short tributary streams flow into larger streams at roughly right angles. Stream pattern is controlled in part by structural patterns in the bedrock. As is true throughout the Coast Ranges, the predominant structural pattern trends northwesterly. Thus, many of the principal watercourses in the area are oriented in a northwest/southeast direction (South Fork Noyo River, Hare Creek, and Caspar Creek).

The California Geological Survey has mapped landslide features and relative landslide potential for the entire Noyo River watershed and for portions of the Big River watershed occupied by JDSF (Manson, Sowma-Bawcom, and Parker 2001; Short and Spittler 2002a; Short and Spittler 2002b). The areas inside and outside of JDSF are generally similar in the percentage of area covered by the various landslide and mass wasting features. Debris slide slopes, followed by rockslides, are the features covering the greatest amount of area. JDSF has a higher percentage of its area in potential inner gorge than does the area outside of the Forest. This situation is of concern because these potentially unstable areas tend to be directly connected to watercourses and have a high likelihood of delivering sediment to watercourses if they release material due to either natural causes or anthropogenic disturbance.

### Hydrology

A USGS stream gauging station has been operated on the Noyo River since 1951. Large runoff events have occurred in 1955, 1964, 1974, 1993, and 2006. Streamflow has been measured in the Caspar Creek basin since water year 1963, with large runoff events documented in 1964, 1966, 1974, 1993, 1999, and 2006. The effects of harvesting and road building on changes in stream flows have been well documented through the work that has been conducted as part of the Caspar Creek watershed study (Ziemer 1998) (see also the website, <http://www.fs.fed.us/psw/topics/water/caspar/>). This project has been carried out jointly by the USFS and CDF since 1962.

### Surface Erosion and Mass Wasting

Surface erosion for the JDSF planning watersheds has been estimated from field survey, results from the Caspar Creek watershed study, and erosion hazard ratings. GIS-produced estimates of erosion hazard rating predict that the eastern planning watersheds have the highest percentage of land in the high or

extreme categories. High sediment delivery to stream channels has been estimated to come from heavily used gravel-surfaced roads within 200 feet of streams. The James Creek planning watershed currently has the highest density of riparian roads. Overall, average sediment delivery from surface erosion associated with JDSF riparian roads is 50 percent of the total estimated from all sources. The legacy effects of old streamside roads were found to be substantial.

Mass wasting on JDSF is dominated by: 1) shallow debris slides associated with roads and landings, and 2) slides in inner gorges and steep colluvial filled hollows. Mass wasting has been carefully analyzed in two planning watersheds—James Creek and Caspar.

### Fluvial Geomorphology

The most significant impact to stream channels located within JDSF boundaries has been the widespread removal of large woody debris (LWD) from low gradient (0-4 percent) stream channels from the 1950s to the early 1990s. This has reduced pool frequency and depths and overall habitat complexity, which has in turn reduced the quality of over-summering and over-wintering habitat for anadromous fishes. Where wood has been removed, stored sediments have flushed, resulting in channel lowering and entrenchment—disconnecting channels from floodplains and reducing backwater habitats—thought to be important refuges for fish during strong winter storms. Additionally, older logging practices that occurred until the mid-1970s resulted in large inputs of sediment into stream channels. Channels in the eastern planning watersheds are particularly degraded due to steeper topography and differences in logging practices; evidence of entrenchment and LWD depletion is most apparent in these channels. Some channels have shown slight recovery from aggradation, but overall most continue to show evidence of high sediment input, increased entrenchment, and reduced LWD.

### Vegetation - General Forest Habitats

Forest dominates the North Coast, Mendocino County, and JDSF. Beyond JDSF to the west there are coastal and aquatic communities. Within JDSF, key forest vegetation types include the Redwood Series, Red Alder Series, Pygmy Cypress Series, and the Bishop Pine Series (Sawyer and Keeler-Wolf 1995, Holland 1986). Other non-forest vegetation communities are limited in area at JDSF and include sphagnum bogs, marshes and grassland

The Redwood Series is the principle vegetation type found within JDSF, comprising approximately 48,000 acres. Redwood (*Sequoia sempervirens*) and Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*) trees dominate the Forest. Other conifers present in the Forest include grand fir (*Abies grandis*), western hemlock (*Tsuga heterophylla*), and Bishop pine (*Pinus muricata*). Hardwoods comprise substantial secondary components in this type and are represented principally by tanoak (*Lithocarpus densiflorus* var. *densiflorus*) and madrone (*Arbutus menziesii*). The mixture of species shifts with distance from the coast, history of the area, exposure and soils. Redwood becomes less dominant moving inland with Douglas-fir and hardwood increasing. Some of the inland areas would be classified as Douglas-fir series by Sawyer and Keeler-Wolf 1995, Holland 1986.

Most of the redwood stands found on JDSF are young (from five to 120 years old), but several small stands of un-entered and residual old-growth forest remain, totaling approximately 459 acres. The management history has influenced the species distribution in the east part of the forest as well. Though conifers dominate the forest overall, hardwoods play a role at JDSF. Young tanoak and madrone dominate young fir and redwood in some areas, and exist within most conifer stands at the mid and lower canopy levels. Hardwoods are more prevalent toward the central and eastern portions of the Forest.

The riparian Red Alder Series found in the western portion of the Forest can contain relatively pure stands of alder. Alder, Big leaf maple, and willow are generally restricted to riparian areas. Additional hardwoods found on JDSF are: California bay, chinquapin, and canyon live oak.

The Mendocino pygmy forest is a unique ecological community that occurs only in coastal Mendocino County. The California Natural Diversity Database (CNDDDB) recognizes it as a community that is “rare and worthy of consideration.” (2003). The Pygmy cypress series covers approximately 613 acres of JDSF near the western extent of the Forest. CDF and California State Parks cooperate to manage some of this area.

Within the Pygmy forest areas there are two Sphagnum bogs. The Pygmy cypress series often lies adjacent to Bishop Pine series. This type is typically found on soils that lack the fertility to support timber and often have pygmy cypress within them. The Northern Bishop pine series is listed by CNDD.

There nine special status plants and lichen that are known to occur on the forest and 25 others that have been identified as likely to occur on JDSF though scoping and discussions with DFG. They are listed in Table 2A.

Fungi and lichen are examples of smaller, less well known organisms present at JDSF. Fungi function as beneficial mycorrhizae, decomposers aiding nutrient cycling, and as pathogens. Fruiting bodies may include mushrooms that benefit wildlife and human foragers. The area known as Mushroom Corners near the intersection of roads 408 and 409 is utilized by several universities, colleges and scientific societies for educational and scientific purposes.

TABLE 2A. Plant Species of Special Concern

Species Common Name, <i>Scientific Name</i>	Legal Status				Local Distribution			
	Federal <sup>a</sup>	State <sup>b</sup>	BOF <sup>c</sup>	CNDDDB- CNPS <sup>d</sup>	North	South	East	West
Pygmy Manzanita, <i>Arctostaphylos mendocinoensis</i>				G1/S1? - 1B.2		X		X
Humboldt Milk-Vetch, <i>Astragalus agnicidus</i>		2		G2/S2.1 - 1B.1	X			
Small Ground-Cone, <i>Boschniakia hookeri</i>				G5/S1S2 - 2.3				
Thurber's reed grass, <i>Calamagrostis crassiglumis</i>				G3Q/S1.2 - 2.1				
Swamp Harebell, <i>Campanula californica</i>				G3/S3.2 - 1B.2		X		X
Northern Clustered Sedge, <i>Carex arcta</i>				G5/S1S2 - 2.2				
California Sedge, <i>Carex californica</i>				G5S2? - 2.3				X
Bristly sedge, <i>Carex comosa</i>				G5S2? - 2.1				
Livid Sedge, <i>Carex livida</i>				G5/SH - 1A				
Deceiving Sedge, <i>Carex saliniformis</i>				G2/S2.2 - 1B.2				
Green Sedge, <i>Carex viridula</i> var. <i>viridula</i>				G5T5/S1.3 - 2.3				
Pygmy Cypress, <i>Cupressus goveniana</i> ssp. <i>pygmaea</i>				G2T2/S2.2 - 1B.2		X		X
Supple daisy, <i>Erigeron supplex</i>				G1/S1.1 - 1B.2				
Coast Fawn Lily, <i>Erythronium revolutum</i>				G4/S2.2 - 2.2				
Roderick's Fritillary, <i>Fritillaria roderickii</i>		2		G4T1/S1.3 - 1B.3				
Pacific gilia, <i>Gilia capitata</i> ssp. <i>pacifica</i>				G5T3T4/S2.2? - 1B.2				
American Manna Grass, <i>Glyceria granids</i>				G5/S1.3? - 2.3				
Glandular western flax, <i>Hesperolinon adenophyllum</i>				G2/S2.3 - 1B.2				
Thin-lobed horkelia, <i>Horkelia tenuiloba</i>				G2/S2.2 - 1B.3				
Hair-Leaved Rush, <i>Juncus supiniformis</i>				G5/S2.2 - 2.2				
Baker's Goldfields, <i>Lasthenia macrantha</i> ssp. <i>bakeri</i>				G3TH/SH - 1B.2				
Coast Lily, <i>Lilium maritimum</i>				G2/2.1 - 1B.1				X
Running-Pine, <i>Lycopodium clavatum</i>				G5/S3S4.2 - 2.3				X
Northern microseris, <i>Microseris borealis</i>				G4?/S1.1 - 2.1				
Robust monardella, <i>Monardella villosa</i> ssp. <i>globosa</i>				G5T2/S2.2 - 1B.2				
Bolander's Beach Pine, <i>Pinus contorta</i> ssp. <i>bolanderi</i>				G5T3/S3.2 - 1B.2		X		X
North Coast Semaphore Grass, <i>Pleuropogon hooverianus</i>		3		G1/S1.1 - 1B.1				
White Beaked-Rush, <i>Rhynchospora alba</i>				G5/S2.3 - 2.2				
Great Burnet, <i>Sanguisorba officinalis</i>				G5/S2.2 - 2.2				
Seacoast Ragwort, <i>Senecio bolanderi</i> var. <i>bolanderi</i>				G4T4/S1.2 - 2.2				
Point Reyes Checkerbloom, <i>Sidalcea calycosa</i> ssp. <i>Rhizomata</i>				G5T2/S2.2 - 1B.2				
Purple-Stemmed Checkerbloom, <i>Sidalcea malviflora</i> ssp. <i>Purpurea</i>				G5T2/S2.2 - 1B.2				
Long-Beard Lichen, <i>Usnea longissima</i>				G4/S4.2 - na	X			X
Oval-leaved viburnum, <i>Viburnum ellipticum</i>				G5/S2.3 - 2.3				
<sup>a</sup> No Federal status plant species	CNDDDB State Ranks: S1 = Less than 6 Eos OR less than 1,000 individuals OR less than 2,000 acres, S2 = 6-20 Eos OR 1,000-3,000 individuals OR 2,000-10,000 acres, S3 = 21-80 Eos or 3,000-10,000 individuals OR 10,000-50,000 acres, S4 = Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat, S5 = Demonstrably secure to ineradicable in California. Threat ranks. #.1 = very threatened, #.2 = threatened, #.3 = no current threats known.							
<sup>b</sup> 2=Endangered, 3=Threatened								
<sup>c</sup> No BOF status plant species.								
<sup>d</sup> CNDDDB Element Ranking: G =global rank /S=state rank	CNPS : 1A. Presumed extinct in California, 1B. Rare or Endangered in California and elsewhere, 2. Rare or Endangered in California, more common elsewhere, 3. Plants for which we need more information - Review list, 4. Plants of limited distribution - Watch list. CNPS threat rank similar to CNDDDB							

Note: Plant status changes, based on 10/12/06 DFG Special Vascular Plants, Bryophytes, and Lichens List. *Sidalcea malachroides* and *Mitella caulescens* were listed in the December 2005 DEIR but now have lower ranking.

### Invasive Weed Species

Aggressive plants that are not native to the area are referred to as invasive weeds. As on neighboring lands, invasive exotic weeds are present at JDSF. Among the plants of greatest concern within JDSF, the California Invasive Plant Council (Cal-IPC) list of "Invasive Non-Native Plants that Threaten California Wildlands" (2006) rates the following as High: jubata or pampas grass (*Cortaderia jubata*), Scotch broom (*Cytisus scoparius*), French broom (*Genista monspessulana*), yellow star-thistle (*Centaurea solstitialis*), Himalayan blackberry (*Rubus amenicus*) and English Ivy (*Hedera helix*). Two locally important species on the same list, Gorse (*Ulex europaeus*) and Cape Ivy (*Delairia odorata*) are found on JDSF, but only in limited numbers due to active Integrated Weed Management. JDSF also contains an area of Tasmanian blue gum (*Eucalyptus globulus*) which is listed by Cal-IPC as Moderate.

The invasive weeds can threaten biodiversity, ecosystem processes and management. Invasive weeds have the potential to displace native vegetation including special status plants. In addition, invasive weeds result in increases in fire hazard and road maintenance, as well as reduced conifer seedling survival and growth. Invasive plants are typically capable of very rapid invasions, in part because of the absence of natural predators or diseases in local ecosystems. Invasive weeds have become established on the State Forest during the past century. The risk of new invasive weed species becoming established on the State Forest over the next 10 to 20 years remains very high.

Many invasive weeds become established in areas where native vegetation has been removed. Roads and open areas along the roadway are often prime infestation zones for weeds. Invasive weeds are often spread along roads by human activities, but wind and wildlife also spread some invasive weed species. Timber operations often create habitat by disturbing the soil surface and creating sunlit openings on the forest floor. Because of prolific seed production, each successive generation can increase the number of seeds in the surface soil (i.e., the seed bank). Successful management of invasive weed species with long-lived stored seeds recognizes that, even if no individual plants can be observed, when conditions are favorable germination of the stored seed will re-infest an area. Many invasive weeds grow rapidly and are not browsed by wildlife as are many native plants. As a result invasive weeds overtop and suppress the growth of neighboring native plants. They are often efficient at utilizing available soil moisture, and some change the soil chemistry, which also increases their competitive advantage.

### Wildlife

Wildlife in the Northern California Ecological Subregion, which includes Jackson Demonstration State Forest, is relatively diverse, although few species are endemic (occurring nowhere else) to the region. A query of the California Wildlife Habitat Relationships System (version 8) for the Northern California Coast Ecoregion and for predominant forest types (Redwood, Douglas-fir, Montane Hardwood, Montane-Hardwood Conifer, and Montane Riparian) yielded a total of 288 species (170 birds, 21 reptiles, 19 amphibians, and 78 mammals) whose range includes a portion of this ecoregion. This represents the maximum number of species that could occur in the area for the forest types queried if other species habitat requirements (e.g., minimum habitat patch size, adjacent habitats, and structural elements) are met, and includes several species that have not been documented on JDSF.

The redwood/Douglas-fir forest provides habitat for a large number of species. However, with the exception of heavily studied species such as the Northern Spotted Owl, there is only limited information on the role of forest composition and forest patch or stand juxtaposition on population dynamics. Maintaining a forested mosaic that helps support the many species in the region is a goal for both forest management and private forest demonstration. Habitat protection and restoration of relatively rare habitat types is also an important element of forest management.

JDSF and the surrounding forested area provides habitat for a number of listed and sensitive fish and wildlife species, including the Northern Spotted Owl, coho salmon, and steelhead. In addition, JDSF currently provides or may provide in the future, habitat for several listed or sensitive species that are not



currently known to occur on the forest. These species include the Marbled Murrelet, Pacific fisher, and Humboldt marten. As such, the large block of publicly owned forestland that is JDSF, in conjunction with other parcels of public land in central Mendocino County, represents a valuable resource of potential reoccupancy and sustainability for at-risk wildlife species.

#### Habitat Elements and Structure

Habitat elements associated with late seral and old-growth forest that are important features for wildlife, such as large snags and downed logs, are widely distributed, but not abundant on JDSF.

#### Old-growth Forest Groves and Individual Old growth trees

Like most of the redwood forests in the region JDSF's stands of old-growth forest are small and fragmented. There are 11 known old-growth groves designated on JDSF, totaling 459 acres. Old-growth residual trees, which were left standing when the forest was first harvested and during subsequent harvests, can be found as isolated individuals or in small aggregations across JDSF. Old-growth forest can also be found near JDSF in state parks. Compared with most large private ownership in the region, JDSF has an abundance of mid-seral stage redwood forest.

A review of the research on wildlife biology and ecology of old-growth forest research has indicated the fact that not all large trees have the same value to wildlife. Nor does age alone determine a tree's value to wildlife. Many slow growing redwood trees retained after logging activity in the 1880s and early 1900s are no longer shaded by neighbors and now grow vigorously, appearing to be (younger) second growth trees. When the core of these trees is examined, the actual age would date the tree back to pre European settlement. These trees lack the structure elements, large limbs and cavities that other old trees possess, and would have wildlife value equivalent to second-growth trees.

Because of the favorable climate and soils of the region and history of harvest, some young trees are now larger than trees that are indeed old. In general, as time progresses, tree size will vary more with the resources available for its growth rather than the number of growth years. Because of redwood's potential to reach great size and age, assessing age only by size is prone to error.

The unique value of the remnant groves on JDSF was recognized since the forest was founded. For the last decade at least, remnant old-growth groves have been protected, along with specific stands of residual old-growth forest and individual large trees with structural characteristics of value to wildlife.

#### Snag Retention and Recruitment

Snags are important structural components of the forest ecosystem, and the dependency of wildlife species on snags ranges from incidental to absolute. Over 90 vertebrate species that occur in Mendocino County prefer or require snags to fulfill a portion of their life history needs (2 species of amphibians, 54 birds, and 36 mammals) (CDFG 1996).

Snags are defined as dead trees greater than 11 inches in diameter at breast height (DBH) and 12 feet or greater in height. These sizes are based on minimum dimensions that afford potential value to most vertebrate wildlife species (Thomas et al 1979). In general, larger snags provide better habitat than smaller snags because they last longer (before they decay and fall), provide better thermal cover, and accommodate a more diverse spectrum of wildlife species.

Because most wildlife find snags with diameters of less than 11 inches to be of limited value, the following summary of snag distribution on JDSF only includes snags with at least 11 inch diameters.

The average density of snags on JDSF is estimated to be 1.9 snags per acre, based on forest inventory plot data. Slightly over half of the snags (57 percent) are conifer, and 43 percent are hardwood. The most common species of snag is tanoak (23 percent), followed by young-growth Douglas-fir and Bishop

pine (20 percent each), madrone (15 percent), and young-growth redwood (8 percent). The diameter at breast height (DBH) of the snags averages 17.6 inches, with a maximum of 44 inches, and does not differ appreciably between conifers and hardwoods.

#### Large Woody Debris

Large woody debris (LWD) includes downed logs, limbs, bark, root wads, and stumps. Lack of LWD on the forest floor can limit habitat use. Past timber harvesting practices have greatly reduced the amount of large woody debris on the forest floor in managed forests. Large woody debris is also an important structural component in aquatic and riparian habitats. Retaining LWD on the forest floor helps to maintain or enhance wildlife habitat and soil nutrient levels.

#### Species of Concern

A total of 23 vertebrate species of concern currently occur or may have a high probability of occurrence on Jackson Demonstration State Forest (Table 2B). Other species of concern are present within the vicinity of Jackson Demonstration State Forest (e.g. Peregrine Falcon). Due to the lack of habitat elements used by these species however (e.g. cliffs for nesting falcons), occurrence in anything other than a transitory nature is a low probability. Similarly, a lack of information on habitat requirements, population distribution, and influence of forest management precludes the development of species specific management guidance in some cases. Additional research and inventory work would be beneficial for these species on JDSF as well as in other parts of the species range. The synergistic effect of conservation strategies for unique habitats, special habitat elements, and other species represents an interim management approach for species where little information exists. The list of species of concern is dynamic in that additional species may be listed in the future, change in species distribution and occurrence status on the forest may occur, or as additional survey and inventory work is completed, habitat relationships will become clearer.

TABLE 2B. Animal Species of Concern Occurring or with a High Probability of Occurrence on JDSF.

Species	Legal Status				Known Local Distribution on JDSF			
Common Name Scientific Name	Federal <sup>a</sup>	State <sup>b</sup>	BOF <sup>c</sup>		North	South	East	West
Southern Torrent salamander <i>Rhyacotriton variegates</i>		1						X
Western Tailed Frog <i>Ascaphus truei occidentalis</i>		1			X			X
Northern red-legged frog <i>Rana aurora aurora</i>		1			X	X	X	X
Foothill yellow-legged frog <i>Rana boylei</i>		1			X	X	X	X
Northwestern pond turtle <i>Clemmys marmorata marmorata</i>		1						X
Marbled murrelet <i>Brachyramphus marmoratus</i>	2	3	1					
Osprey <i>Pandion haliaetus</i>		1	1		X			X
Great Blue Heron rookery <i>Ardea Herodias</i>			1					
Great Egret rookery <i>Casmerodius albus</i>			1					
Bald Eagle <i>Haliaeetus leucocephalus</i>	2	3	1					
Cooper's hawk <i>Accipiter cooperi</i>		1			X			
Northern goshawk <i>Accipiter gentilis</i>		1	1					
Sharp-shinned hawk <i>Accipiter striatus</i>		1			X			
Northern spotted owl <i>Strix occidentalis caurina</i>	2	1	1		X	X	X	X
Vaux's swift <i>Chaetura vauxi</i>		1				X		X
Olive-sided flycatcher <i>Contopus borealis</i>	1				X	X	X	X
Yellow warbler <i>Dendroica petechia brewsteri</i>		1					X	X
Tricolored Blackbird nesting colony <i>Agelaius tricolor</i>	1	1						
Purple martin <i>Progne subis</i>		1						X
Sonoma tree vole <i>Arborimus pomo</i>		1			X	X	X	X
Coho salmon <i>Oncorhynchus kisutch</i>	3	3			X	X	X	X
Steelhead <i>Oncorhynchus mykiss</i>	2				X	X	X	X
Chinook salmon <i>Oncorhynchus tshawytscha</i>	2							

<sup>a</sup> 1= Bird of Conservation Concern; 2=Threatened, 3=Endangered<sup>b</sup> 1=Species of Special Concern; 2=Threatened , 3= Endangered<sup>c</sup> 1=Sensitive

### Aquatic Resources

JDSF contains parts of 17 planning watersheds, as delineated and defined by CALWATER version 2.2. The proportion of each planning watershed that is part of JDSF ranges from 1 to 99 percent. A legacy of extensive land use activities has left its imprint on the watersheds in the region. These activities include timber harvesting, road building, railroads, and both residential and commercial development. Historic harvesting activities during the period of 1860 to 1940 included the building of a successive series of dams to back up large quantities of water to flush masses of cut logs downstream to sawmills. The Big

River watershed is documented as having had as many as 27 dams (for excerpts from W. Francis Jackson's book, "Big River was Dammed," and related historical photos, see <http://www.krisweb.com/krisbigriver/krisdb/html/krisweb/history/bigdam.htm>).

The current condition of aquatic resources has been evaluated in multiple studies, including identification of sensitive aquatic resources and potential hazards affecting these resources. Much of the focus was on habitat conditions present for coho salmon and steelhead trout.

Historically, coho salmon and steelhead occurred in all of the planning watersheds within the Forest. On JDSF there are about 90 miles of streams with fish habitat, and within the planning watersheds draining JDSF there are about 192 miles. Steelhead are found in all 15 planning watersheds reviewed; coho salmon were found in 12 of the 15 planning watersheds. Coho generally use stream channels with less than 4 percent gradient and were found in 92 miles of the class I watercourses found in the 15 planning watersheds (i.e., about 48 percent of the total Class I stream mileage present).

Current habitat conditions were evaluated for several factors. Work completed in 1993 showed that the percentage of pool space filled with fine sediment, or "v-star", was on average about two times higher when compared to that found for undisturbed channels in the same geologic type (Knopp 1993). This finding indicates high fine sediment supply, but it is within the range of those found for other North Coast watersheds with similar management histories. LWD loading in the Caspar Creek watershed was reported to be two to seven times lower than that found in old-growth redwood systems with similar drainage areas (Napolitano 1996). Water temperature has been measured throughout JDSF since 1993. Maximum weekly average temperatures (MWATs) have been calculated and compared to acceptable thresholds for coho of 62.2° F. The primary area where MWATs have exceeded this threshold has been in the eastern planning watersheds draining JDSF. The North Fork Big River planning watershed, furthest from the coast, has the highest water temperatures and has exceeded the threshold several times. Shading estimates were made from air photos taken in 1996, and in general, streamside shade was high, particularly in the northern and western planning watersheds.

Impacts of past management have reduced the amount of suitable habitat available. An increase in the amount of rearing habitat is expected to provide the greatest increase in salmonid production.

The regional declines in salmonids have resulted in various State and Federal threatened and endangered listings of individual species and or Evolutionarily Significant Unit (ESU) by both State and Federal fisheries agencies. The status and distribution of steelhead, Coho and Chinook are shown in Table 2B (*Animal Species of Concern Occurring or with a High Probability of Occurrence on JDSF*). This table also includes reptile and amphibian species of concern that utilize aquatic habitat.

Aquatic habitat elements important to both salmonid conservation and other aquatic resources are included below and are also discussed in the Watershed Section in this plan. Aquatic habitat elements important to both salmonid conservation and other aquatic resources are included below or in the Wildlife Section. Riparian areas, wetlands and large woody debris are important components of aquatic ecosystems.

### Wetlands

The wetlands on JDSF are small in extent, but of high public interest and biological value. They include two *Sphagnum* bogs, a few scattered ponds, stream margins and several springs and seeps. *Sphagnum* bogs are found within the Pygmy forest and are recognized as sensitive community by CNDDDB, the California Department of Fish and Game's Natural Diversity Database. A large man-made pond (McGuire's Pond) with associated wetland is located at the headwaters of the South Fork of the Noyo River, within a private in-holding surrounded by JDSF in the Highway 20 corridor. Wetlands support specialized plant communities, which in turn provide foraging and breeding habitat for a diverse array of invertebrates, amphibians, reptiles, birds and mammals.

Wetlands are afforded protection under Section 404 of the Clean Water Act, which is administered by the U.S. Army Corps of Engineers. The definition of wetlands (i.e., wetlands that fall under the regulatory authority of the Corps) is based on three parameters: (1) surface soil saturation or inundation for at least 14 days during the growing season; (2) the presence of hydric soils; and (3) the presence of certain diagnostic plants (known as wetland indicator species) (US Army Corps of Engineers 1987).

### Recreation and Other Forest Uses

The coastal area of Mendocino County is a popular destination for recreationalists, most of whom visit the area to be close to the beaches. In addition to public beaches and coastline, there are several forested parks available. JDSF provides important public recreational resources, receiving an estimated 61,000 recreational visitors per year. Although approximately 10 million people live within a 5-hour drive of JDSF<sup>1</sup>, most of the recreation activity on the Forest is from Mendocino County residents. There are over 60 individual campsites, many miles of riding and hiking trails, and over 200 miles of forest road utilized by the public. Maintenance of these facilities is an important management component and historically has been funded from timber harvest revenues deposited in the Forest Resource Improvement Fund (FRIF) account. Other common recreational activities conducted on the Forest include picnicking, hunting, swimming, wildlife viewing, and target shooting. The Forest also is a local source of firewood and other minor forest products such as mushrooms and greenery for both personal and commercial use.

JDSF is just one of many public outdoor recreation facilities in the North Coast region. For example, there are over 56 state parks and beaches in this region. These facilities receive an estimated 11 million visitors per year (Department of Parks and Recreation 2003). In Mendocino County alone there are 22 state parks. In the context of public redwood forest recreation opportunities in the state's coastal regions, JDSF represents about 14% of the area and less than 1% of the annual visitation.

JDSF represents the most significant public land available for mushroom collection in this area. State Parks prohibit the practice of mushroom collection. Universities and mushroom societies from the Bay Area travel specifically to JDSF because of CDF policies allowing the collection of mushrooms, with the issuance of permits.

### Domestic Water Supplies

Several municipal and domestic water supplies utilize runoff from JDSF. The City of Fort Bragg draws approximately 60 percent of its water supply from an intake on the Noyo River 2.5 miles downstream of the confluence of the South Fork Noyo River with the main stem. Fort Bragg also draws water by direct surface diversion from Newman Gulch and Waterfall Gulch, two small streams in the Lower Noyo River and Hare Creek planning watersheds, respectively. Parlin Creek Conservation Camp is supplied by water pumped from an infiltration gallery 20 feet below the bed of the South Fork Noyo River, downstream of the confluence of Parlin Creek. The system takes about 8,000 gallons per day, and supplies 115 people. When turbidity is high, water is supplied from storage tanks. The maximum shut down period has been about five days. Chamberlain Creek Conservation Camp obtains most of its water for domestic use from a surface water source on a tributary of Chamberlain Creek. This system supplies water for 130 people. Mendocino Woodlands Camp is supplied by several in-stream collection points and springs located on JDSF property. In addition to these water supplies, there are 27 other listed water rights in or near JDSF, although they are not all actively used. They are mostly for domestic use and irrigation.

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<sup>1</sup> Population information from 2003 California Statistical Abstract available on the Internet at [http://www.dof.ca.gov/HTML/FS\\_DATA/STAT-ABS/Sa\\_home.htm](http://www.dof.ca.gov/HTML/FS_DATA/STAT-ABS/Sa_home.htm).

## Current Forest Management

The discussion in this section reflects management of JDSF under the 1983 and earlier forest management plans.

The legal mandate for management of Jackson Demonstration State Forest is to demonstrate financially viable sustainable forestry practices in a broad range of forested habitats and forest structure conditions in the North Coast region of California. The North Coast region contains a large variety of forest stand types, and landowners practice a broad range of harvesting and forest management techniques. The owners of these working forests benefit from the research and demonstration that JDSF and other demonstration forests provide.

The diversity of forest conditions that have been cultivated on JDSF through 60 years of management offers unique opportunities for research and demonstration. The variety of forest structures found on JDSF, from recently regenerated stands to old growth, make the Forest an enormously valuable resource as a working forest laboratory for research and demonstration. Forest structure, inventory, and growth are monitored on a regular basis, and the information is used to predict both future structure conditions (including wildlife habitat characteristics and values) and forest growth and yield.

In order to be truly sustainable, forest management must maintain the ecological processes and biological diversity of the forest and watersheds. To this end, JDSF management has maintained and developed a diverse range of forest habitats and stages of forest development.

JDSF is managed under sustainable forestry principles. Annual harvest has averaged well below annual growth. As a result, many second-growth stands on the Forest are growing older and becoming increasingly stocked with larger and older trees. An integral part of management is the regular harvest of a sufficient acreage to maintain an adequate representation of early to mid seral forest structures. These “maintenance” harvests may not have a research function, but they serve the essential purpose of maintaining the range of forest structure conditions necessary to stay relevant as a managed research forest. Every timber sale on JDSF has not had a direct research purpose, but every timber sale has contributed in some way to cultivating the range of forest structure conditions necessary to remain relevant as a working research and demonstration forest.

Watershed protection levels at JDSF have been, and will remain high. This level of protection offers unique research opportunities, including the opportunity to test and monitor the effects of proposed new regulations. Forest restoration is an essential element of forest management, providing opportunities to test and monitor both active and passive approaches associated with management of riparian zones, the forest road system, older forest structures, and habitat development.

The development of high value forest products culminates in the sale of forest products to private entities, which contributes to the local economy. Timber sales, described in greater detail below, may be of varying sizes, with substantial variation in the harvest methods and the volume of timber that is made available. Minor forest products, including firewood, mushrooms, and greenery are also offered to small businesses and the general public.

### Forest Structure

Forest structure refers to the unique combination of tree species, tree sizes, tree numbers, and tree spacing, along with other forms of vegetation (e.g., shrubs, forbs, grasses, fungi) that can become established among and beneath the trees. The structure of forest is reflective of conditions that promote regeneration and growth of the vegetation. Vegetation responds to opportunities to regenerate, and subsequent growth is influenced by available light, moisture, and nutrients. As forest develops, the vegetation competes for light and moisture, creating abundant diversity of conditions. The removal of trees, as individuals or in groups, creates openings in the forest, and opportunities for regeneration and remaining vegetation to occupy these spaces.

Depending upon the amount of light that reaches the forest floor, various species of brush, forbs, and grasses may become established and persist. As forest stands change, due to natural development or stand management activity, the spacing and size of the trees is variable, and the level of undergrowth will change. This dynamic is commonly referred to as vertical and horizontal diversity.

Historic management and natural forest development have combined to produce a mix of conditions within the Forest. Most of the original old forest was harvested by the Caspar Lumber Company between 1860 and 1955. Where this harvesting involved the cutting and burning of entire stands, which was common practice prior to the 1940s, the resulting young forest developed in an even-aged condition, where most of the trees are of nearly the same age and the forest canopy tended to become closed very early. This canopy condition tends to inhibit the growth of brush and forbs near the ground surface. After World War II, the cutting of old forests tended to be conducted in increments, where the larger trees were removed initially, followed by subsequent removal of smaller trees on one or two occasions. These conditions are prevalent in the North Fork of the Big River watershed and its tributaries (Chamberlain and James Creek watersheds). Each time that these areas were harvested, an opportunity was created for young trees to regenerate, so these areas tend to be occupied by stands with trees in two or more distinct age classes, along with scattered residual old trees that were not cut due to size, defect, or logistical circumstances.

Active management of young forest stands began during the 1960s. This management involved multiple forms of partial cutting as well as clearcutting. Clearcutting of young forest occurred primarily during the 1980s and early 1990s. Where this practice occurred, the resulting forest is very young and even-aged, rapidly approaching a closed canopy condition where the high level of shade will impede the development of brush and forbs. Where partial cutting methods have been employed in young stands, conditions are variable, and these stands are commonly characterized by having trees of two or more distinct ages, as well as having some brush and forbs growing under the canopy due to increased levels of light produced by the removal of trees.

The principal conifer species present within JDSF are coast redwood and Douglas-fir. These species commonly occur together within the Forest, with redwood typically more prevalent. Other minor conifers are present, including grand fir, hemlock, and bishop pine.

Most of the forest stands also include a hardwood component, with the predominant hardwood species being tanoak. Other hardwoods that occur include Pacific madrone, red alder, and live oak. Within conifer-dominated stands, the hardwoods are generally incapable of attaining the same height growth as the conifers, and eventually occupy a place below the crowns of the taller conifer trees.

There are a few remnant stands of virgin old growth within the Forest, in addition to several hundred acres of partially harvested old forest. Structural components characteristic of older or late seral forest stands (e.g. snags, down logs, live trees with cavities and large limbs) exist throughout the forest at levels typical of middle aged and mature second growth stands in the redwood region.

The property has been conservatively harvested, resulting in a relatively high volume of standing timber. Because growth exceeds harvest, the forest continues to build inventory, and management has fostered the development of a broad range of structure conditions.

### Resource Inventories

Estimates of timber volumes and other vegetation characteristics are derived primarily from a system of plots referred to as the JDSF Forest Resources Inventory (FRI). The inventory used as a basis for the Management Plan was established in 1989 and augmented in 1997 to account for harvested areas and under-represented timber types. In total, the inventory incorporates 1,896 individual inventory plots (1,506 from 1989 and 390 from 1997).

The inventory was based on a stratified random sampling design. The plots were located on randomly selected points of a 10-chain grid. The plots were installed as 3-plot clusters or single plots, with each plot being comprised of three nested fixed radius plots. Trees 11 inches and greater were measured on the largest plot (1/5 acre). Trees 7 inches and greater were measured on the intermediate plot (1/20 acre). Trees smaller than 7 inches were tallied by 2-inch classes on a 1/100-acre regeneration plot. Tree measurements included species, diameter breast height and live crown ratio. A subset of trees was also measured for total height, defect, and 10-year radial increment.

Forest inventory has been monitored since 1959 through the implementation of a Continuous Forest Inventory (CFI) system. A 60 by 60 chain grid of 141 one-half acre rectangular plots was installed throughout the Forest. The system was designed to track changing forest conditions and structures within reasonable tolerances for the Forest overall. Six measurements have been completed since 1959 using the original plot design (1959, 1964, 1969, 1974, 1979, and 1984). In 1989, with the implementation of the new intensive forest inventory system, the CFI system was transitioned into the new system by using only the center one-fifth acre circular plot area similar in plot design to the rest of the new system. In 1999, the first re-measurement of these one-fifth acre plots was completed, corresponding to 40 years of tree measurement data. The most recent measurement of the CFI plots occurred in 2005.

Historical harvests on the Forest have averaged 29 million board feet per year over the past 20 years of normal operation.

#### Timber Sale Program

The State Forest plans for and schedules regular timber sales as directed by Board policy and existing management plans.

Forest product sale transactions are broken into two categories based on size, Class I sales and Class III sales. An intermediate Class II category was discontinued in 1976. Class I sales are limited to no more than 100 thousand board feet in volume, and cannot exceed \$60,000 in value. These sales tend to consist of salvage operations, power line right-of-way clearance, and other small lots of timber. Class I sales of other forest products have a limit of \$10,000, and typically include firewood, split products, poles, greenery, and mushrooms. The Department of General Services exempts CDF from the requirements for competitive bidding for Class I sales, although these sales can be bid when it is appropriate. (For example, it may be desirable to use a bidding process to select a purchaser of a small sale when there are many people interested.)

Class III sales cover the major timber sale program, and are awarded through a competitive bidding process. Sale volumes have ranged from 100,000 board feet to more than 15 million board feet. Most sales are between 5 and 12 million feet. A Timber Harvesting Plan is prepared for each major timber sale.

Following consultation with the forest manager and forest staff, and after review of the Management Plan a timber harvesting plan and sale contract are prepared. The sale is appraised and advertised. A prospectus for each sale is sent to persons and organizations found on a mailing list that currently has about 100 names of potential purchasers, local logging contractors, and other interested parties. The sale is also listed on the California State Contracts Register website.

An advertising period of four to five weeks is typically provided to allow purchasers and contractors ample time to evaluate the sale and the contract provisions. Sales usually have bid dates in late winter or early spring, which allows the contract to be awarded and approved and operations to begin shortly after the end of the winter period.

Sale contracts are valid for one to two operating seasons, depending on the volume to be logged, the amount of new road to be constructed, the complexity of the operation, and how early in the year the sale is awarded. Normally, the contract for a sale of less than six or seven million board feet will be designed for completion in one season, and a larger sale will run for two seasons.



In most cases, the lead forester during sale preparation will serve as the contract administrator during the operational phase. This provides continuity of site-specific familiarity and ensures immediate feedback on the strengths and weaknesses of the harvest design. Administrative inspections are intended to ensure compliance with the timber sale contract. Inspections of the sale area are made at least weekly, and more often during critical or sensitive phases of operation. Additional administrative duties include monitoring harvesting progress and the request of stumpage payments on a timely basis.

State Forest sale administrators do not double as CDF Forest Practice inspectors on the sales which they administer. Although sale administrators, as Registered Professional Foresters and as CDF employees, have a duty to enforce the Forest Practice Act and Rules and associated approved harvest document, there is potential of a perception of conflict of interest. It is important that there be oversight of Act, Rule and THP compliance by CDF inspectors who are not State Forest staff. State Forest sale administrators are expected to recognize and report apparent Forest Practice violations, but should not be asked nor given the authority to encroach on the jurisdiction of CDF's Forest Practice program in determining that something is not a violation.

The contract administrator's responsibilities extend beyond the completion of timber harvesting, to include inspection and arrangement of maintenance of erosion control facilities during the maintenance period, and ensuring that harvest units meet stocking requirements.

### Recreation

Recreational opportunities found on Jackson Demonstration State Forest are unique to the coastal region. They are informal, free of charge, unsupervised, and diverse. Primary recreational activities include camping, picnicking, hiking, biking, driving, horse-back riding, and hunting.

The objectives of the previous forest management plan developed in 1983 were to provide facility development sufficient to meet the projected average peak demand while remaining compatible with management of the timber resource, and to use recreation demand as an opportunity to inform the public about JDSF's timber and research activities. In the past 10 years, average peak demand has not been quantified other than by tracking the annual camping days per year. Although the past 10-year period has averaged 16,000 overnight-use days per year, the total number of visitor-use days exceeds this by an estimated factor of three when day-use visitors are included.

Although public use on the Forest has not diminished over time, priorities for implementing a recreation program have fluctuated with political goals and their resultant budgets. The goal of integrating recreation management, forestry education, resource protection and timber harvesting to demonstrate compatible use has been ongoing by default since the State Forest's inception as well as with directed attention.

With the exception of the two Conservation Camps and areas undergoing active timber operations, nearly all of the 48,652-acre forest is open for public access. There are 21 campgrounds within the boundaries of JDSF, and most of these offer opportunities for swimming or wading. In 1999 there were over 12,200 days of use by campers who typically stay for two to four days. Roughly half of the users are from Mendocino County. The road system and easy access from Fort Bragg, Mendocino and Willits allows for extensive day use. It is estimated that day use comprises at least three times as many visitor-days as overnight camping (50,000 days). Unlike the surrounding smaller State Parks, JDSF has more roads available for use and allows a much wider range of recreational uses (horse back riding, mountain biking, and hunting). Jackson does not collect any fees for recreational uses but does provide considerable public value to the visitors.

The majority of visitors live in Mendocino County, but an increasing number of visitors are from outside of the county. The rise in non-local visitors may be attributed to increased publicity from travel guides as well as large annual events held on the Forest, and perhaps in the future from the Internet. Campgrounds are always full for the holiday weekends during the summer. The majority of the campsites are only open seasonally.

A recreational use survey was conducted in 1988. The findings of this study showed that 25 percent of the respondents visit JDSF for the purpose of environmental education, but the majority of respondents (50 percent) visit JDSF to observe nature. Approximately 24 percent of the respondents indicated that less logging would make the forest a better place to visit. The survey specifically queried only a few adjacent landowners. The survey confirmed that Mendocino County residents comprise the majority of visitors to the Forest. Visitors value the fact that access and camping is free on the Forest.

## Facilities

Maintenance of existing facilities has been the primary recreation management objective for the past several years. As staffing levels and budgets varied over the years, priorities fluctuated. The majority of recreational facility maintenance has been made possible by utilizing crews from the two Conservation Camps located on the Forest. Refer to the Appendix VI for existing facilities and specific opportunities found therein.

Camp Host sites are located on the Forest at the two multiple-site campgrounds: Camp One (west end) and Dunlap Camp (east end). Information and camping permits can be obtained from the Camp Hosts. Currently, the only other locations where information can be obtained are from the JDSF headquarters (Fort Bragg) or the Mendocino Unit headquarters (Willits) during business hours on weekdays. Camp Hosts have been key in reducing the frequency of vandalism to campground and day-use facilities. Their physical presence acts as a deterrent as well as their routine maintenance of campground facilities.

The trail system on the Forest varies from designated self-guided interpretive trails and developed hiking trails to skid trails and logging roads (both old and new). There are four designated non-interpretive hiking trails that are located in JDSF: Camp One Loop, Trestle, Waterfall Grove, and Woods Trail. These trails are primarily limited to foot traffic travel although other non-motorized uses are not restricted. The Sherwood Trail is part of a regional trail designed for equestrian use that is not maintained by JDSF and continues into Fort Bragg across private property. Off-road vehicles also utilize these "trails" illegally.

## Special Events

There are several special events that occur each year that require specific contracts for using the Forest: weekly equestrian trail rides, an annual Enduro equestrian race, and an annual Skunk Train bicycle ride.

## Camp 20 Highway Stop

A very large number of people utilize the Camp 20 facility as a highway rest stop, or to stop and make phone calls from the phone booth. The area has a vault toilet (installed in 2000), pay phone, picnic tables, and ample room for parking of cars and heavy trucks.

## Passage Via Highway 20 and Road 408, and Other Forest Roads

Thousands of travelers pass through JDSF annually along Highway 20, County Road 408, Road 500, and Road 700. County Road 408 is often used as an alternative route when Highway 20 is blocked. The route is not well signed from Highway 20 to Mendocino (or Caspar), but this does not appear to discourage use.

### Road Management

The road system serves as the main point of public contact with the forest, and also serves as the conduit for management activities, including the transportation of staff, researchers, equipment, and forest products.

Forest roads on JDSF are used for timber harvesting, forest management activities, forest protection, public access, and recreation. The current road network reflects a history of various transportation technologies and forest practices. Beginning in the 1870s, railroads were used to transport logs in some watersheds and railroad grades were located along or adjacent to streambeds. Some JDSF roads use remnants of the old railroad grades in several places.

Most of the roads on JDSF, however, were constructed from the 1950s to the 1970s. Roads constructed during this period generally included an inboard ditch and cross drains. Concentrated runoff from this type of road has been shown to be a major source of fine sediment, because the inboard ditches are often connected directly to stream channels (Wemple et al 1996). Additionally, a considerable amount of sediment originates at or near points where streams are crossed by roads and from large fill failures. Current road density averages approximately 4.9 mi/mi<sup>2</sup>, with densities ranging from 6.7 mi/mi<sup>2</sup> in the James Creek planning watershed to 2.6 mi/mi<sup>2</sup> in the Brandon Gulch planning watershed. For all the JDSF planning watersheds, the average amount of JDSF area covered by roads is 3.6 percent. Improvement of JDSF roads to reduce sediment yield is needed due to the legacy of a road network partially relying on out-dated drainage systems and old segments located along watercourse channels.

### Minor Forest Products

The Department currently offers the public and private commercial interests the opportunity to purchase minor forest products, subject to specific rules and constraints. At present, permits can be purchased for collection of products including salvage sawlogs, poles, split products, greenery (e.g., boughs, shrubs, and ferns), mushrooms, and firewood. Class I sale permits are issued for the collection of these minor forest products.

#### Salvage Sawlogs

Logs may be purchased from the State Forest, subject to permit constraints and applicable state regulations. Payments are generally made on the basis of log volume removed from the State Forest. The purchaser is responsible for paying all applicable yield and sales taxes. The removal of salvage sawlogs requires the purchaser to be in possession of a valid timber operator's license. Prices for logs to be removed are subject to negotiation between the purchaser and the State Forest manager. All timber operations are limited by the Forest Practice Rules and constraints established by the State Forest manager. Typical State Forest constraints include provisions for clearance from watercourses, slope limitations, wet weather restrictions, and pre-location of yarding and hauling facilities. All log locations are pre-specified. No logs and wood products originating from standing snags or old-growth trees may be collected.

#### Firewood

Firewood permits are available from the State Forest. Firewood collection permits can be purchased for personal and commercial purposes after payment of a fee. Commercial producers are responsible for payment of all applicable taxes. Firewood collection is limited to dead and down material, and does not include either old-growth material or potential conifer sawlogs. Firewood collection is limited to pre-designated areas, and is generally subject to constraints such as watercourse clearance, slope limitation, weather conditions, and access road designation.

### Greenery

Permits to collect greenery are available to the public. Very little of this activity occurs as a general rule, but a few permits are issued every year. In recent years, permits have been issued for the collection of Douglas-fir boughs, ferns, salal, and huckleberry brush. Payment varies by product, being either on a volume basis or an item basis.

### Mushrooms

Mushroom collection permits may be purchased for both personal use and commercial collection. Collection volume is limited, although areas of collection are not constrained.

### Poles and Split Products

Permits may be purchased for collection and manufacture of poles and split products. Old-growth material may not be collected. Payment is made on an item or volume basis, and the purchaser is responsible for payment of all applicable taxes. Typically, poles are derived from thinning of young redwood/Douglas fir stands. Very little split product is manufactured, due primarily to the restriction against collection of old-growth material. Areas near watercourses are restricted in order to retain large woody debris with specific ecological value.

Periodically, the State Forest manager establishes permit prices, volume or numerical limits, and conditions of collection for the various minor forest products collected by the public. For personal use items, permit prices are nominal and are intended to cover the costs of administration of the permit process. Conditions of collection, collection location and collection limits (volumetric or numeric) are based upon an assessment of potential impacts that could result from the collection process and removal of the resource. Current collection limitations and pertinent data are included in Appendix VII.

### Invasive Weed Species

Aggressive plants that are not native to the area are referred to as invasive weeds. These invasive weeds can threaten biodiversity and ecosystem processes which then may impact management. Invasive weeds are rapidly spreading throughout all regions of the United States. Jackson Demonstration State Forest and the surrounding area are not immune to this problem. Some of the most common invasive plants in central Mendocino coast are jubata (Pampas) grass, broom, gorse and ivy. There are several different species of broom and ivy that are present on the Forest. Invasive weeds have the potential to displace native vegetation including special status plants. In addition, invasive weeds result in increases in fire hazard and road maintenance, as well as reduced conifer seedling survival and growth. Invasive plants are typically capable of very rapid invasions, in part because of the absence of natural predators or diseases in local ecosystems. Invasive weeds have become established on the State Forest during the past century, with several species becoming particularly problematic in recent decades. The risk of new invasive weed species becoming established on the State Forest over the next 10 to 20 years remains very high.

No single solution currently exists for management of invasive weed species. Multiple methods have been tried both locally and throughout the region. Given invasive weeds affect most wildlands on the Mendocino Coast; cooperation across ownerships is critical to management. In the last few years a local cooperative weed management area has formed and begun to coordinate managing the invasive weeds on the Mendocino Coast. JDSF is a partner in this effort with State Parks, Mendocino Land Trust, the

local California Native Plant Society and other local agencies and organizations. Sharing resources and information is making management more effective on the Mendocino Coast.

### Use of Herbicides

Herbicides have been used on JDSF for control of both native and non-native species. Very little herbicide use occurred prior to the late 1980s. After that time, herbicides were periodically utilized within even-aged harvest units to control both native and non-native species that presented a significant level of competition to conifer regeneration. This treatment was generally a hand spray application of herbicide to control native hardwoods, native brush, and invasives such as French broom and Jubata grass.

Herbicides were also utilized to control and clear roadsides of invasive species, including French broom and Jubata grass. This treatment occurred primarily during the early to mid-1990s, and involved hand spraying of herbicides directly on target plants. Some native brush species, such as ceanothus were also controlled during this treatment process.

### Parlin Fork Management Area

The Parlin Fork Conservation Camp houses inmates of the state correctional system. Security around the camp is needed to ensure that there is no inappropriate interaction between inmates and the public. This situation makes it difficult to conduct normal timber harvest operations in proximity to the Camp without bringing loggers and inmates into contact.

In 1992 it was determined that a permanent solution to this problem was needed. It was decided to delineate a 312-acre area around the Conservation Camp where the timber resource would be managed by CDF personnel and harvested with CDF equipment and crews rather than by private logging contractors. This was made feasible by a state-operated sawmill at the Camp that operates on timber harvested from the Parlin Fork Management Area. This mill manufactures the local logs into dimensional lumber for use by state government facilities.

A long-term management plan covering silvicultural, harvesting and post-harvest activities in the Management Area was prepared by CDF staff at Parlin Fork and approved by the Department in 1992 pending its inclusion in the Jackson Demonstration State Forest management plan. The plan for the Parlin Fork Management Area calls for sustained yield management using a group selection method, with harvests generally conducted annually. Applied management objectives that simulate those of a non-industrial private timberland owner are described in the plan.

After allowing for protection of riparian zones, deleting non-forested areas, and providing a camp area buffer, there are approximately 240 acres remaining that are available for active timber management. This net acreage is divided into 15 units, each of about 16 acres. The group selection method is implemented by harvesting in one unit each year, regenerating about three acres in group openings, and conducting a stocking control and stand improvement commercial thinning in the remainder of the unit. Thus, each unit will be treated on a 15-year cutting cycle. Up to four acres in each unit will be made available for retention of large trees, protection of identified wildlife habitat elements, and development of late seral habitat characteristics.

Non-commercial cultural treatments include site preparation, prescribed burning, artificial regeneration, manual release, and precommercial thinning.

Harvesting in the Parlin Fork Management Area is exempt from the THP requirements of the Forest Practice Act because the products manufactured from the harvested timber are used by state government and are not sold. (See the definition of "timber operations" in the Act, §4527.) However, all harvesting is planned in full consideration of the potential for environmental effects, and supervised by a CDF forester

to ensure that operations meet the standards of the Forest Practice Act and Rules and are consistent with the management plan for the Parlin Fork Management Area.

### Heritage Resources

Jackson Demonstration State Forest contains a variety of heritage resources. The term *heritage resources* is used in this management plan as a convenient term to include all forms of archaeological, historical, and other cultural resources. At JDSF these commonly occur in the form of both prehistoric and historic archaeological sites, usually containing features and/or artifacts. Many of these sites, both on an individual basis and taken as a whole, are significant under the criteria used to evaluate heritage resources. These sites can be associated with events that made a significant contribution to the broad patterns of our history. They can be associated with the lives of important persons in our past, some embody distinctive characteristics of a type, period, or method of construction, and many have the potential to yield information important to the understanding of prehistory or history (USDI National Park Service 1998). Agencies of the State of California have been directed to preserve and protect the heritage resources under their jurisdiction for the benefit and inspiration of the people of California. JDSF holds the potential to make significant contributions to the study of both the history and prehistory of this region. The importance of the prehistoric sites to living Native Americans is also an important consideration.

### History of Research

The North Coast Range region has played a prominent role in the development of archaeological research in California. The rich prehistoric legacy of this area has provided substantial information towards the understanding of California's prehistory. The prehistoric archaeological sites on JDSF hold the potential to make significant contributions towards the reconstruction of the prehistory in this region. JDSF is one of the few significant publicly owned tracts of land that encompasses a large cross-section of the North Coast redwood forest belt. As such, the forest offers a unique opportunity to investigate the prehistoric utilization and lifeways within this environment by examining a variety of site types within a specific physiographic zone. The archaeological study of these resources could provide a more complete understanding of the pattern of prehistoric land use of the North Coast Range and the settlement-subsistence patterns of Native Americans.

JDSF is located within the territory of the Pomo, an ethnographic group that occupied an extensive portion of northwestern California. The Northern Pomo held the territory encompassed by JDSF and were bordered on the north by the Coast Yuki. There is a rich ethnographic record for the Pomo, but very limited material for the Coast Yuki. The major ethnographic sources relevant to JDSF have been reviewed and summarized by Levulett and Bingham (1978) and more recently by Betts (1999).

The historic utilization of the forest is more well-known, with a body of historic records to supplement the archaeological resources. Logging on the Mendocino Coast began in the 1850s with intensive cutting of redwood and tanoak near the coast. As these supplies were depleted, it became necessary to penetrate further into the interior. A system of narrow-gauge railroads was built in the latter part of the nineteenth century in order to transport the massive redwood logs to the coastal shipping points such as Caspar. A system of main lines and spur tracks, along with trestles, work camps, fueling points, incline railways, steam donkeys, and other ancillary features was constructed over a period of many decades reaching deep into the redwood forest belt. By the 1930s the heyday of railroad logging had run its course, in part due to the increased efficiency of truck hauling. The remains of the early railroad logging system are widely distributed over the forest (Gary and Hines 1993). The history of JDSF has been summarized by Levulett and Bingham (1978). Additional studies covering JDSF history are listed by Foster and Thornton (2000).

## Research at JDSF

Archaeological investigation on JDSF began in 1970 with the documentation of Three Chop Village (CA-MEN-790) by Harriette Thomsen. In 1978, a cultural resource overview was prepared for JDSF (Levulett and Bingham 1978).

During the summer of 1984, the Albion Project staff from San Jose State University conducted archaeological excavations at Three Chop Village (CA-MEN-790). Three contact-period house depressions were excavated at this Mitom Pomo site. Three cultural components were identified, the earliest interpreted as pre-Pomo, and the later two as Pomoan occupations.

The historic resources inventory prepared for JDSF by Gary and Hines (1993) documented 172 resource locations. This inventory was initially compiled through a record search at the Northwest Information Center, a review of JDSF files, oral interviews with JDSF personnel, and limited site visits. A set of maps was prepared to plot the suspected resource locations and a preliminary significance assessment was made of the visited locations.

Test excavations were conducted at Misery Whip Camp by Mark Hylkema in 1995. This small historic site contained an abundance of historic artifacts including "penny pipes", and evidence of blacksmithing. The site appears to have been associated with early logging technology utilizing oxen yarding and "splash dam" transportation to the sawmill. This may be one of the earliest logging camps on the forest, predating the railroad logging period. This archaeological study was conducted to evaluate site significance and recover information as mitigation for possible unavoidable impacts from timber operations.

A recent archaeological investigation at JDSF has resulted in the relocation and re-recording of eighteen of the twenty known prehistoric sites located within the forest (Betts 1999). These sites were documented with complete site records prepared in accordance with California Office of Historic Preservation (OHP) guidelines (CDPR 1995), and included Primary Records, Archaeological Site Records, Photographic Records, Artifact Illustrations, Site Maps, and Location Maps plotted on both the JDSF map and the appropriate USGS 7.5' quadrangle. This study included a descriptive inventory, an integrity assessment, and management recommendations for these prehistoric archaeological sites.

The reports on heritage resources that have been prepared for JDSF (Betts 1999; Gary and Hines 1993; Levulett and Bingham 1978) have outlined the major periods of prehistoric and historic occupation of the forest and include specific listings of many of the recorded sites. These studies provide the basic framework necessary for the future interpretation and evaluation of these sites.

## Current Practices

CDF has developed a comprehensive heritage resource management program at JDSF to preserve and protect the resources located within the forest. A system of procedures has been implemented to prevent impacts to archaeological sites during timber harvest operations. Proposed Timber Harvesting Plans (THPs) are evaluated as per the requirements of Forest Practice Regulations for identifying, recording, and protecting heritage resources. Projects other than THPs are reviewed as prescribed by the California Environmental Quality Act (CEQA) which also includes an archaeological investigation and impact analysis. Additional heritage resource management projects that are not project-related, have been designed to meet the specific needs of the individual resource.

## Project Planning and Review

Each THP prepared for JDSF includes a Confidential Archaeological Addendum (CAA). This document consists of an archaeological investigation that includes pre-field research, Native American consultation, field survey, documentation of findings, preliminary significance assessments, and site protection measures. This report is prepared either by a CDF staff archaeologist or JDSF staff forester with the required archaeological training.

## Database

CDF maintains a comprehensive database of the known heritage resources located within JDSF. This information is housed at the CDF Archaeology Office in Sacramento, the Coast Cascade Regional Office in Santa Rosa, and JDSF Headquarters in Fort Bragg. This database consists of archaeological site records, survey reports, resource location base maps, and artifact collections. All archaeological reports and site records that are prepared for JDSF are submitted to the Northwest Information Center of the California Archaeological Inventory at Sonoma State University. The Information Center is consulted at five year intervals for any updated material that needs to be added to the CDF database.

A composite base map of all known heritage resource sites within JDSF is kept by the Forest Manager and the CDF Regional Archaeologist in Santa Rosa. These base maps are periodically updated to reflect new information. Access to these confidential maps is on a need-to-know basis, with site locations only being disclosed when protection measures must be implemented for a specified undertaking.

## Survey Strategy

Lands within JDSF are systematically surveyed for heritage resources prior to all timber harvest operations in order to identify any heritage resources that may be impacted by project operations. Archaeological sites that are located as a result of these surveys are recorded and protected during logging operations. Although there has never been a complete survey of the entire forest, a substantial area has been surveyed for heritage resources, mostly during review of individual project undertakings. These surveys are conducted by a CDF staff archaeologist, JDSF personnel with CDF archaeological training, or a consulting archaeologist.

## Protection Practices

All significant heritage resource sites identified as a result of project planning are protected. Where possible, resources are protected by altering projects to avoid impacts on the resource. Additional site protection practices that are commonly employed during timber harvesting operations include the establishment of equipment exclusion zones, directional felling of trees away from sites, reuse of facilities with no modification, use of rubber tired equipment, and monitoring of operations by personnel with archaeological expertise.

JDSF contains an extensive network of historic-era railroad grades and their associated structural remains such as trestles. These railroad trestles are protected from management activity, but are not maintained. The railroad grades themselves are not protected unless a portion of the grade demonstrates some unusual feature. Many of these railroad grades have been converted to roads in the past.

There are two standing historic buildings on JDSF. The "Little Redwood Schoolhouse" located at Camp 20 is approximately 80 years old and was moved by railroad between logging camps by the Caspar Lumber Company. The "Cat Barn" is a structure located at Camp 20 that was built in 1940 by the Caspar Lumber Company for repair of equipment. This building has sustained considerable deterioration. Based on an evaluation conducted in 1989, it was determined that maintenance or restoration would not be feasible.

Among the remnants of early logging operations at JDSF are two steam donkeys and a locomotive. One of the donkey engines has been partially restored to protect it from further deterioration and is on display at the Camp 20 Recreation Area. The second donkey engine is on loan to the Roots of Motive Power at the Mendocino County Museum grounds in Willits. This engine has been restored to operational condition and is on public display. "Daisy", one of the original steam locomotives used by the Caspar Lumber Company, has been partially restored by the Parlin Conservation Camp, and is on loan to the City of Fort Bragg where it is also on public display.

Research-oriented test excavations have been carried out at two sites on the forest, Three Chop Village (Layton 1990) and Misery Whip Camp (Hylkema 1995).



Data and Information Management

As a research and demonstration forest, JDSF has a large number of different data sets from various research projects. Most of these legacy data are stored separately in flat files. As part of ongoing management of the Forest, there are also several operational data sets, including GIS data layers, continuous forest inventories, intensive forest inventories, and other resources data, including wildlife and stream surveys.

Most data are accessible, but may require custom software for processing. JDSF is currently building a state-of-the-art information system to integrate all survey data on the Forest into a database management system, the State Forest Data Bank. Future resource data will be integrated using a common format. The enhanced access to data will benefit managers, researchers and the public. Access to publications is currently available on [www.demoforests.net](http://www.demoforests.net). This web site is being updated with materials from JDSF and is the first phase of the data bank.

Property Configuration

Jackson Demonstration State Forest is a nearly contiguous ownership. There is only one outholding, an area of about 800 acres located in the southwest portion of the Forest. All but one of the several inholdings are in the western half of the property. These are held by private non-industrial owners and include both agricultural and rural residential uses. Most of the western inholdings are in the southwestern corner, between County Roads 408 and 409. The one inholding at the east end of the Forest is a 160-acre parcel owned by Coastal Ridges LLC.

Staffing and Budget

## Staffing

The level of staffing to manage JDSF has been augmented recently to reflect recognized needs.

General DutiesClassification

State Forest Manager  
Research, Demonstration & Education Program

Deputy Chief  
Forester II  
Forester I  
Forestry Assistant II

Timber Sale Program

Forester II  
Forester I (3py)  
Forestry Assistant II

Administration, Recreation Program  
Wildlife Biologist  
Road Program  
Geology  
Clerical

Forester II  
Senior Biologist Specialist  
Forester I  
Engineering Geologist, CGS (1/2py)  
Office Assistant  
Account Clerk (1/2 time)  
Heavy Fire Equipment Operator  
Research Program Specialist II  
Fire Captain Specialist  
Aide, Annuitant (2.5py)

Road Maintenance  
Geographic Information System  
Law Enforcement and Fire Prevention  
Seasonal work, misc.

**Budget****Personnel Budget**

The annual budget to support personnel on JDSF is approximately \$1,650,000 (including benefits). This figure includes approximately \$119,000 to support seasonal employees.

**Operating Budget**

The State Forest was allocated approximately \$369,000 for the current fiscal year (2006/07) to fund basic Forest operation.

**Research, Demonstration, and Monitoring Funds**

JDSF shares available funds with the other state forests for purposes of financing grants for research and demonstration and to conduct monitoring projects. The available funds for FY 06/07 include \$217,000 for purposes of research and demonstration projects and conduct of monitoring activities within the State Forest system.

**Regional Economic Role of Jackson Demonstration State Forest****Introduction**

The large forest industry holdings in the redwood region represent much of the unfragmented areas of natural vegetation in a region with limited federal forestlands. The many smaller non-industrial forest land ownerships cover nearly as much area as the industrial holdings and account for most of the forest land that could be relatively easily converted to agricultural or residential uses. Many of the larger lots within rural residential areas and on the outskirts of denser residential and commercial areas also provide considerable tree cover and wildlife habitat, even if the forest habitats are fragmented. All of these forests provide unique open space values and recreational opportunities between the rugged coastline and the drier interior valleys and mixed forests and rangelands.

JDSF offers many opportunities for hiking, hunting, horse back riding, mountain biking, recreational driving, and primitive camping, thus complementing the numerous parks developed around old growth stands of redwoods and Douglas-fir that dot the region. Many of these more dispersed recreational opportunities offered by JDSF are not allowed in parks, where they would interfere with the preservation goals or could conflict with specific areas with high intensity use, such as the well visited groves and river banks.

From an employment perspective, forest management and related employment provide a substantial proportion of the better paying jobs available outside of the cities on the North Coast. The remaining sawmills and wood remanufacturing plants still make up a significant component of the regional manufacturing base. In addition to the direct employment created by these manufacturing jobs, the businesses also generate demand for many locally produced goods and services. Employment related to recreational activities on the state forest are part of the larger and diverse tourism and outdoor recreational industries that are based on a mix of coastal, inland, and urban-based activities. Compared to the Wine Country, San Francisco Bay Area, and the Tahoe Basin, there are many opportunities on JDSF to increase recreational use by improving recreational infrastructure such as signs, trails, benches, and special use trails that can co-exist with the ongoing forest management.

As the region completes a transition from an area dominated by an old-growth based forest industry to a more diversified economy and a new set of social and economic opportunities, it is worthwhile to identify the larger local and regional framework within which a demonstration state forest operates.

The legislated intent for Jackson Demonstration State Forest foreshadowed the importance of managing young growth forests, long before the harvest of young growth trees surpassed that of old growth during the 1980s. Public Resources Code section 4631 states:

It is hereby declared to be in the interest of the welfare of the people of this state and their industries and other activities involving the use of wood, lumber, poles, piling, and other forest products, that desirable cutover forest lands, including those having young and old timber growth, be made fully productive and that the holding and reforestation of such lands is a necessary measure predicated on waning supplies of original old growth timber.

More recently, the California Timberland Productivity Act of 1982 (Public Resources Code § 51102) establishes one of its goals to “discourage premature and unnecessary conversion of timberlands to urban and other uses.”

Non-industrial timberland owners manage approximately half of the private forestland in the North Coast region. Nearly all of these forests were initially harvested decades ago and have been regenerated. Unlike the industrial timberland owners who have permanent staff to manage the land and may have strong financial interests in related sawmills, remanufacturing plants, and wholesale timber businesses, many of the non-industrial forest land owners are less dependent upon long term forest management, and are not very knowledgeable in the complexities of managing forests. The demonstration mandate of the state forests includes demonstration of the long-term physical and financial viability of managing young forests. If the values of long-term forest management are not demonstrated to owners of small to mid-sized forest tracts, there is greater potential for these lands to be converted to other uses, and the economic, social, and environmental impacts of expanding forest fragmentation could be magnified across the region.

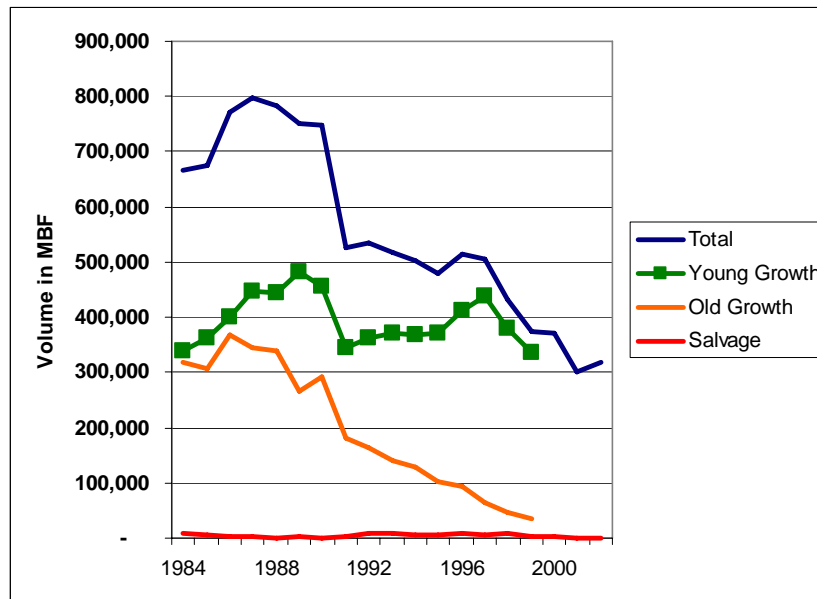
Table 2.1 provides a more detailed description of the industrial and non-industrial private forest (NIPF) owners of the North Coast, in terms of some of the basic characteristics of timberland inventories from the last full evaluation of private timberlands in the region. Non-industrial timberlands have lower total per-acre inventories (3.45 versus 3.69 thousand cubic feet/acre) and overall forest growth rates (2.7% versus 3.6%) than industrial timberlands. Additionally, a consistent pattern across the region is that NIPF owners' lands have higher stocking rates of hardwoods (1.49 versus 1.01 thousand cubic feet/acre) and lower stocking rates of softwoods (1.97 versus 2.28 thousand cubic feet/acre). Demonstrations on how to improve the long term productivity of these timberlands, especially where high hardwood inventories exist, is one of the most common requests of private landowners and consulting foresters in the region.

<b>Table 2.1 Inventory Characteristics of Private Timberlands of the North Coast and JDSF</b>				
Variable	Non-Industrial Private Forests (NIPF)	Industrial Timberlands	Total Private Timberlands	Jackson Demonstration State Forest
Timberland Acres	1,336,000	1,402,000	2,738,000	48,652
Total Inventory per acre (thousand cubic feet/acre)	3.45	3.69	3.58	7.22
Conifer Inventory per acre (thousand cubic feet /acre)	1.97	2.68	2.33	6.77
Hardwood Inventory per acre (thousand cubic feet /acre)	1.49	1.01	1.24	0.45
Conifer as Percent of Total	57%	73%	65%	94%
Sources: Timber Resource Statistics for the North Coast, 1994, Waddell and Bassett and JDSF				

### The Transition to a Young Growth Redwood Economy

Over the past twenty years, the redwood region has nearly completed the transition to a forest management economy based upon the sustainable management young growth forests. As shown in Figure 2.1, the harvest of young redwood surpassed old-growth in the mid 1980s and currently makes up nearly all of the total redwood harvest.

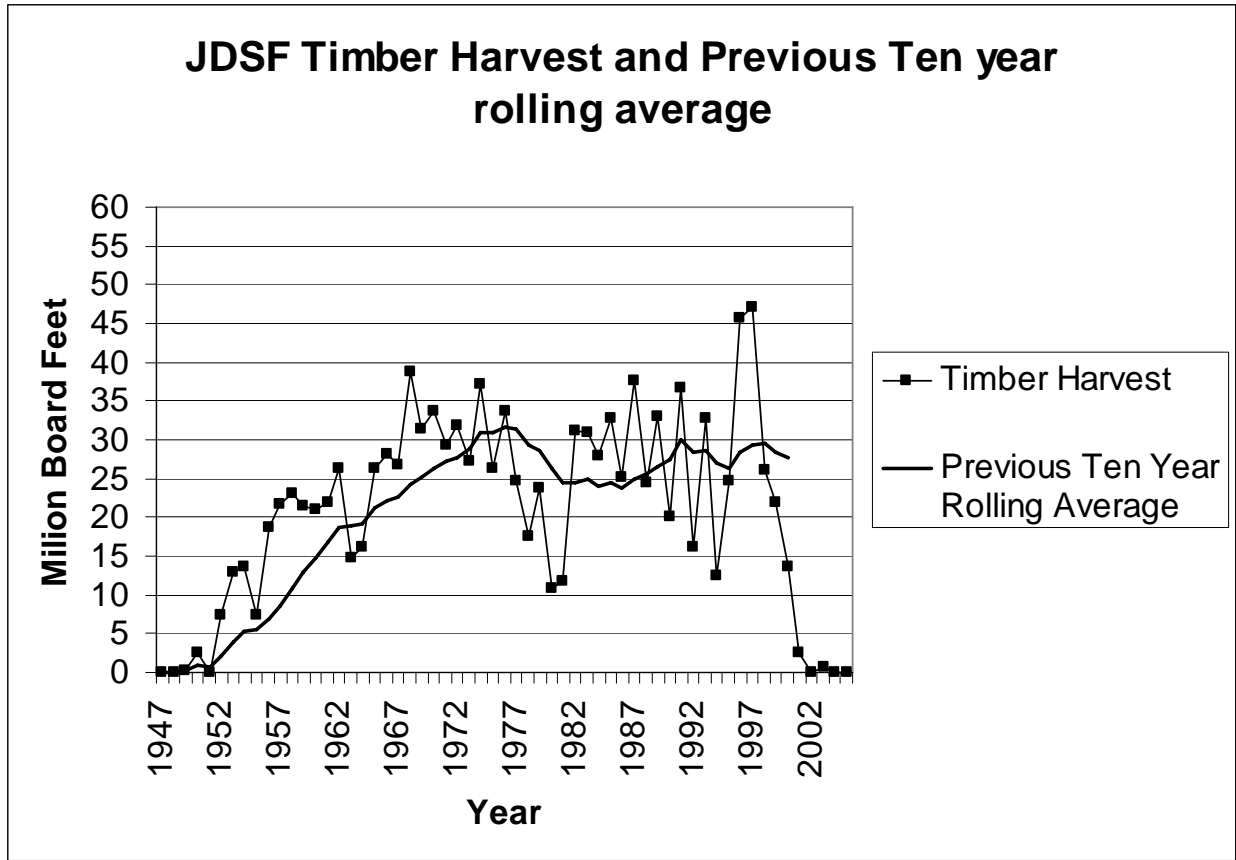
After the mid 1980s, old growth harvests declined very rapidly and harvests shifted to young growth. Compared to alternative land uses such as residential, grazing and vineyards, young growth forestry can still provide a flow of valuable wood products, local employment, open space, wildlife habitat, and watershed protection values. However, alternative land uses have the potential to provide higher financial benefits to landowners.



**Figure 2.1. Total, Young, Old, and Salvage Harvest Trends for Redwood, 1984-2002.**  
**Source: Board of Equalization 2004**

### Sustained Yield Timber Production on JDSF

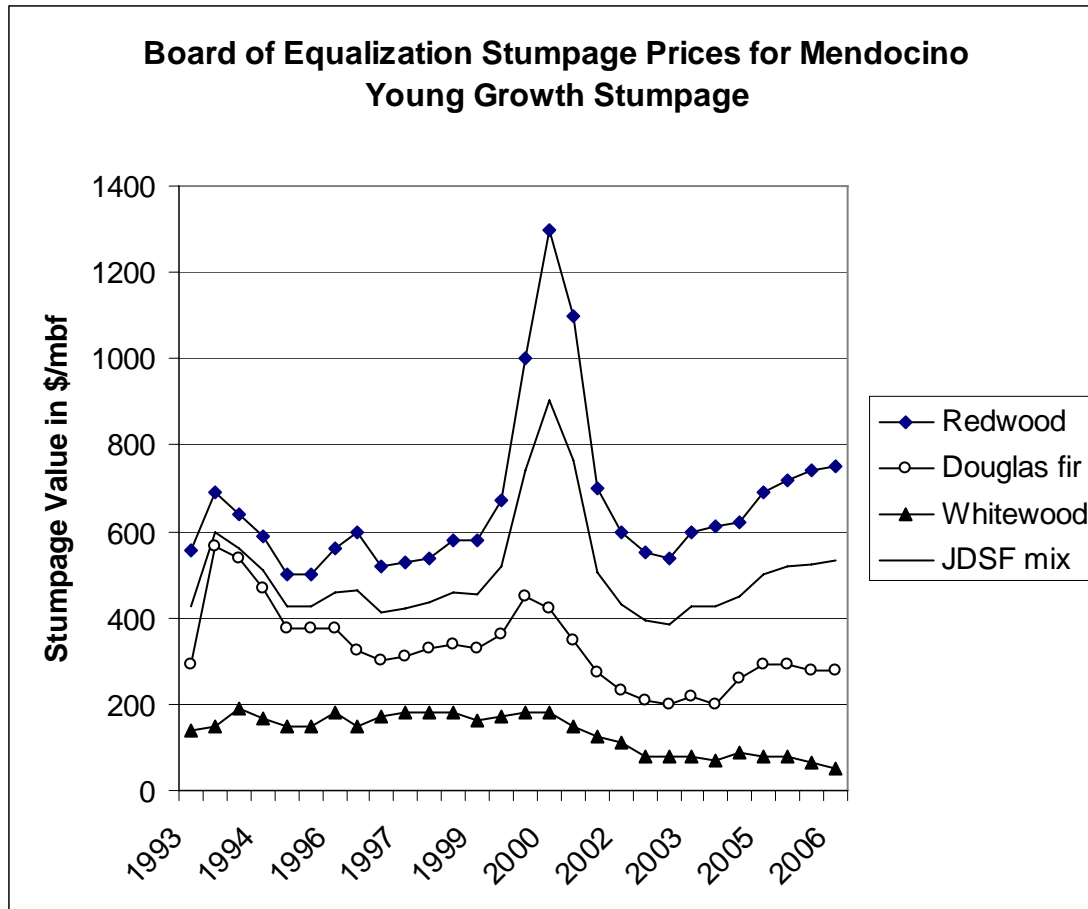
As described elsewhere, forest growth vastly exceeded forest harvest levels during the first three decades of state ownership of JDSF. For the next three decades, the long term average harvest level was between 25 and 30 million board feet per year (Figure 2.2). With an estimated current annual growth of around 60 million board feet per year across the Forest, historic and projected harvest levels are less than half of the potential of harvest levels equal to forest growth levels.



**Figure 2.2. JDSF Timber Harvest since 1947.**

Growth and yield projections presented in detail elsewhere demonstrate that much higher levels of sustainable production are possible. Proposed future harvest levels are heavily dependent on research and demonstration goals to be achieved using a wide variety of management techniques. Across roughly one third of the forest, the goals call for maintaining high levels of older forest structure for wildlife habitat and other goals—many of which maintain high inventory levels and/or limit harvests.

The forest inventory and commercial harvests at JDSF consist primarily of three main species – redwood, Douglas-fir, and a variety of true fir (or whitewood) species. The following table shows the historic price trends as well as the average value of the harvests on the State Forest.



**Figure 2.3. Stumpage Prices for Mendocino County Young Growth Timber, 1993-2006.**

#### Timber Related Employment and Taxes

Local economies can grow and prosper when they have strong basic economic sectors that can produce and sell goods and services to outside markets. Timber, agricultural products, manufactured goods and tourism are all examples of goods and services that bring revenue into the region. When these revenues are expended locally as wages or business purchases, they support a much larger number of local service jobs, both private and governmental. Retirees and other new residents bring investments and retirement funds from outside of the local area, which help to support additional local jobs. The diminished growth of the stock market since 2000 has reduced the scale of this type of personal income. The challenge of any regional economy is to have a diversified range of basic sectors to balance out cyclical changes.

Local jobs that involve commodities or services that are sold outside of the county or region have added benefits that flow from the fact that workers and the businesses that employ them spend most of their wages and a considerable fraction of business purchases locally. This generates additional local employment. The California Spotted Owl Report (CASPO) report (Ruth and Standiford 1994) estimated that there was one indirect job for every regional timber job in the Sierra Nevada. The FEMAT report, covering the region of the Northern Spotted Owl in California, Oregon, and Washington estimated 1.1 indirect jobs for every direct timber job. Stewart (1993) estimated 0.85 indirect jobs for every direct timber job based on county data before 1992. The huge loss of timber jobs is related to the protection and management of the northern spotted owl and the Federal Government's Northwest Forest Plan (60,000 jobs in Oregon alone). Unfortunately this change provided a massive test of the economic model estimates of the direct to indirect job relationship from a reduction in direct timber employment. The

general conclusion was that every job lost in the timber industry would jeopardize approximately one additional job in other industries. (ECONorthwest, The Economic Impacts of the Proposed Siskiyou Wild Rivers National Monument, June 28, 2000. <http://www.econw.com/pdf/siskiyouNM.pdf> ).

The survey data in Table 2.2 are taken from the 2003 Occupational Employment Statistics (OES) survey for their North Coast region that includes Del Norte, Humboldt, Lake and Mendocino counties. The wages have all been updated to the first quarter of 2004 by applying the Employment Cost Index to the 2003 wages. Details of the methodology and revision are available at [http://www.calmis.ca.gov/file/occup\\$/oeswages/oestechnotes.htm](http://www.calmis.ca.gov/file/occup$/oeswages/oestechnotes.htm).

<b>Table 2.2. Employment and Mean Annual Wage for Selected Occupations, North Coast, 2003.</b>		
Occupational Title	2003 Employment Estimates	Mean Annual Wage
First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers	120	\$40,803
Forest and Conservation Workers	440	\$21,495
Fallers	130	\$51,267
Logging Equipment Operators	300	\$36,497
Sawing Machine Setters, Operators, and Tenders, Wood	360	\$30,463
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	130	\$30,861
<b>Timber Industry - weighted</b>	<b>1,480</b>	<b>\$31,721</b>
First-Line Supervisors/Managers of Food Preparation and Serving Workers	510	\$25,013
Cooks, Fast Food	310	\$16,866
Cooks, Institution and Cafeteria	270	\$25,722
Cooks, Restaurant	950	\$18,299
Cooks, Short Order	750	\$17,394
Food Preparation Workers	620	\$18,322
Bartenders	430	\$18,021
Combined Food Preparation and Serving Workers, Including Fast Food	1,850	\$16,188
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	920	\$16,692
Waiters and Waitresses	1,470	\$15,595
Food Servers, Non-restaurant	60	\$18,294
Dining Room and Cafeteria Attendants and Bartender Helpers	390	\$15,788
Dishwashers	550	\$16,165
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	230	\$15,618
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	1,340	\$21,950
Maids and Housekeeping Cleaners	1,560	\$16,894
Recreation Workers	320	\$21,919
First-Line Supervisors/Managers of Retail Sales Workers	1,170	\$33,782
Cashiers	5,100	\$18,543
Gaming Change Persons and Booth Cashiers	160	\$20,278
Counter and Rental Clerks	420	\$20,255
Parts Salespersons	160	\$27,954
Retail Salespersons	2,810	\$22,064
<b>Tourism Industry - weighted</b>	<b>21,430</b>	<b>\$19,700</b>
Source: <a href="http://www.calmis.ca.gov/file/occup\$/oeswages/NorCoastoes.xls">http://www.calmis.ca.gov/file/occup\$/oeswages/NorCoastoes.xls</a>		

Based on these samples of representative jobs, each tourism type job pays only about 62% (\$ 19,700 v \$31,721) of the annual wages of a timber industry job. Therefore, approximately 1.6 new tourism industry jobs would be required to replace the loss of each timber industry job to maintain a balanced economic impact within the region. While such a shift would balance regional economics in a gross sense, many of the affected individual timber workers would face a reduction in personal income.

For predicting employment changes related to changing levels of harvest output from Jackson Demonstration State Forest, or other timberlands in Mendocino County, a conservative ratio of 8 direct workers per million board feet of harvest was used rather than the much higher jobs/MMBF ratios experienced in Mendocino since 2000, as documented in the DEIR. The total of 8 direct jobs per million board feet of harvest is based on 7 workers per MMBF in sawmills and related wood remanufacturing plants and 1 worker per MMBF working in the logging, log transport, and reforestation sectors.

Table 2.3 presents a range of employment, regional income, and local tax estimates that would correspond to various levels of annual timber harvest. In addition to the benefits to local workers and local government revenue, increased economic output from the state forest supports other local business revenues. It also provides the funds necessary to continue to upgrade the road system to reduce sediment and peak water flow runoff, maintain research programs, fund the extension and outreach program, and improve recreational facilities. In simple terms, every change of 10 million board feet of annual harvest is related to 160 jobs, \$4.3 million in local wages, and \$184,000 in local taxes.

Along with state parks in the region, JDSF provides areas for visitors and residents to enjoy a range of outdoor activities that are a key piece of the attractions to the coast-based recreation and travel industry. Compared to the numerous state parks in central Mendocino, the larger state forest has fewer developed facilities and scenic landscapes than the nearby state parks, but provides a greater array of opportunities for activities that may not fit well within the smaller state parks such as mountain bike riding, horse riding, hunting, off-lease dog walking, and the collection of forest products such as mushrooms and ferns. Since JDSF collects few fees for these activities and most of the activities are rarely the sole reason for visitors it is hard to place an economic value on the estimated 60,000 recreational user days per year. A rough estimate of how much users would pay for similar experiences can be made by using a \$5/visit fee estimate that is not uncommon for higher use metropolitan wildland parks. This leads to an estimate of an annual value of around \$300,000 per year that accrues to the recreational visitors. Most economic assessments of wildland recreation conclude that these users, especially when they are from outside of the local area, spend far more than the actual or estimated entrance value on food, lodging, and recreational equipment and rentals.

Current recreational opportunities on Jackson Demonstration State Forest do not appear to be directly tied in a positive or negative manner to harvest levels since the harvest units are scattered across the forest and are only closed for a limited period of time. In the short term, recreational use will move when seasonally limited to permit the safe use of harvesting and reforestation equipment. The ability of JDSF to maintain recreational infrastructure such as roads, trails, and trash removal is reduced when reductions in timber revenue force decreases in personnel working on the Forest. In the longer term, a combination of JDSF staff resources, internally generated funds, external grants, and partnerships with local recreation use organizations will drive the design, development, and economic benefits of new recreational opportunities on the forest.



<b>Table 2.3. Employment and Revenue Effects of Various JDSF Timber Harvest Levels.</b>							
<b>Variable</b>	<b>Timber Harvest MMBF (million board feet)</b>	<b>5</b>	<b>10</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>50</b>
\$500/MBF	Stumpage value	\$2,500,000	\$5,000,000	\$10,000,000	\$15,000,000	\$20,000,000	\$25,000,000
2.60%	Local yield tax to Mendocino	\$65,000	\$130,000	\$260,000	\$390,000	\$520,000	\$650,000
Fixed by acreage	Property tax	\$112,438	\$112,438	\$112,438	\$112,438	\$112,438	\$112,438
Full-time equivalent positions	JDSF timber staff	5	10	15	20	20	25
8 jobs per MMBF	Direct Timber Employment (based on Mendocino and Humboldt ratios)	40	80	160	240	320	400
8 jobs per MMBF	Indirect Timber Employment (1:1 ratio)	40	80	160	240	320	400
\$31,721 (same as direct estimate)	Estimated Wages JDSF	\$158,605	\$317,210	\$475,815	\$634,420	\$634,420	\$793,025
\$31,721 (2003 salary survey)	Direct Wages non JDSF	\$1,268,840	\$2,537,680	\$5,075,360	\$7,613,040	\$10,150,720	\$12,688,400
\$19,700 (2003 salary survey for service workers)	Indirect Wages	\$788,000	\$1,576,000	\$3,152,000	\$4,728,000	\$6,304,000	\$7,880,000
	Total Wages	\$2,215,445	\$4,430,890	\$8,703,175	\$12,975,460	\$17,089,140	\$21,361,425
1.25% of wages	County Sales Tax from wages (JDSF, Direct, Indirect)	\$27,693	\$55,386	\$108,790	\$162,193	\$213,614	\$267,018
	All Local Taxes (timber, property, sales on wages)	\$205,131	\$297,824	\$481,228	\$664,631	\$846,052	\$1,029,456
	Local Employment	85	170	335	500	660	825

### Research and Demonstration

Research and demonstration are primary elements of the mission for JDSF established by the State Board of Forestry and Fire protection. The research and demonstration projects are funded by the net receipts from the timber harvests and represent a significant reinvestment into the forest. The overall purpose is to demonstrate how forest landowners (especially non-industrial owners who typically under-invest in forest management and lack economies of scale in environmental assessments and harvesting costs) can improve the overall condition of forest management. Effective research and demonstration requires areas with a wide range of effectively monitored practices that are maintained over the life of the projects. It is important to distinguish between the general management prescriptions for the State Forest and silvicultural prescriptions that are part of specific research studies. For example, the collaborative Caspar Creek watershed study between CDF, and the USDA Forest Service was designed in part to investigate the effect of clearcutting on soil erosion, sediment production and water flow. This study has provided valuable insights into the environmental effects of different patterns of road building and harvest, but it should not be interpreted as representative of operational management on the Forest.

Ownerships of less than 500 acres comprise over 50 percent of the forested land base on the North Coast. Compared to industrial timberlands, non-industrial private forestland holdings have considerably lower total inventories and overall forest growth rates. A consistent pattern found across the whole region is the high hardwood stocking level that generates little or no revenue. In addition to increasing the overall financial profitability of forestlands, an increase in conifer forest components would improve fish and wildlife habitats for many species. The need for continued forest research at JDSF for both non-industrial and industrial forestland could be presumed based on the extent of forestlands existing on the north coast as illustrated in the following table.

TABLE 2.4. Inventory of Characteristics of Private Timberland of the North Coast

Variable	Total Private	Industry	Nonindustrial Private Forests (NIPF)
Timberland Acres	2,738,000	1,402,000	1,336,000
Total Inventory per Acre (thousand cubic feet/acre)	3.58	3.69	3.45
Conifer Inventory per Acre (thousand cubic feet /acre)	2.33	2.68	1.97
Hardwood Inventory per acre (thousand cubic feet /acre)	1.24	1.01	1.49
Conifer as Percent of Total	65%	73%	57%
Forest Growth Rate	3.2%	3.6%	2.7%
Source: Timber Resources Statistics for the North Coast, 1994, Waddell and Bassett			